

Compaction tests with Nuclear Densimeter – June to November

U/F Sand Placement Test -ASTM D 6938						Method:	# Cell:	N° Layer:	
Date:						MPSA-RT:	Area m²:	Shift:	
Location:							Vol. m³:	Time: (am/pm)	
MDD (kg/m³):		OMC (%):					Thickness mm:		
Nuclear Test Density						Coordinates			
Thickness	Uni.	DD (kg/m³)	MC (%)	%MDD (%)	Pass/Fail	North	East	Elev. (m)	Sampling
300	mm	1597	9.8	101.0		983116	536440	49.90	✓
	mm								
	mm								
300	mm	1586	10.2	100.3		983166	536446	48.12	
	mm								
	mm								
	mm								
	mm								
	mm								
	mm								
	mm								
	mm								
	mm								
	mm								
	mm								
	mm								
	mm								
	mm								
	mm								

Tech: ian

Company: ITP

Name: Gustavo P.

Font: 39601

Sign: [Signature]

Observations: Capa #1

[illegible]

Cobre Panamá

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U/F Sand Placement Test - ASTM D 6938						Method:	# Cell:	N° Layer:			
Date:	30-9-21					MPSA-RT:	17897	Area m²:	3436.70	Shift:	DIA
Loca:	TM F MSDH							Vol. m³:		Time: (am/pm)	9:00 am
MDD	g/m³:	1561	OMC (%):	19.5				Thickness mm:			
Nuclear Test Density						Coordinates		Elev. (m)	Sampling		
Th	ness	Uni.	DD (kg/m³)	MC (%)	%MDD (%)	Pass/Fail	North	East			
400	mm	1622	15.7	103.9			982927	535707	83.13	✓	P#1
700	mm	1646	12.6	105.5						✓	
1000	mm	1669	15.7	106.9						✓	
1300	mm	1653	16.5	105.9						✓	
1600	mm	1631	14.9	104.5						✓	
1800	mm	1689	15.3	108.2						✓	
	mm										
400	mm	1596	12.9	102.3			982870	535689	84.09		P#2
700	mm	1631	13.1	104.5							
1000	mm	1637	15.2	104.9						✓	
1300	mm	1654	15.0	106.0							
1600	mm	1648	16.9	105.6							
1800	mm	1632	16.1	104.6							
2000	mm	1659	16.3	106.3							
	mm										

Technician:	Name: Santo Santos	Sign: 
Company:	ITP	
Observations:	Calicatos Darcarga Hidráulica Punto #1 y punto #2.	

Cobre Panamá

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Sand Cone Compaction Tests – June to November

Sample Identification		 FIRST QUANTUM MINERALS LTD. Cobre Panamá	
1	Informacion General (<i>Informacion General</i>)		
	Sample number (<i>Numero de muestra</i>):	MPSA-SC-114	
	sampld date (<i>Fecha de muestreo</i>):	26-Jun-21	
2	Material Information (<i>Informacion del Material</i>)		
	Source (<i>Fuente</i>)	Pre-Strip / Botija Quarry / J.O Crusher	
	Work Area (<i>Area de Trabajo</i>)	TMF WRP #1 Cell N°44 Finger Drain (In Place)	
	Borrow - Foundation - Excavation - Crusher - Fill - Site Investigation - Other: <i>Prestamo - Fundacion - Excavacion - Crusher - Relleno - Investigacion de Sitio - Otro:</i>		
	Fill Zone (specs 1824-363-CI-SPC-0003): <i>Zona de Material:</i>		
	Material Type <i>Tipo de Material</i>	Zone 3	Density Test Sand-cone Method
	Remarks: <i>Comentarios: Received: 04:15hrs</i>		
	Used materials MPSA-11509		
	Stations (along dam center line) <i>Estaciones (Eje de Presa)</i>	Start sta.:	End Sta.:
	Coordinates - GPS or Survey <i>(Coordenadas - GPS o Topografia):</i>	N: 982661	E: 538691
	Depth used to estimate elevation: <i>(Profundidad a la que se tomo la muestra):</i>	110mm	
	Recorded Ground elevation: <i>(Elevacion del terreno)</i>	El. 81.51m	
Technician:	Name: YG	Signature:	
Lab Supervisor:	Name: CG	Signature:	

Form No. 1824-QC-LST-057 Rv02 Dual language

MINA COBRE PANAMA

Density and Unit Weight of Soil in Place by Sand-Cone Method
(ASTM D1556)



Sample Type: **Zone 3** Technician: **YG** Location: **TMF WRP #1 Cell N°44 Finger Drain (In Place)**

Lab. No: **MPSA-SC-114** Date Tested: **26-Jun-21**

Fill Material Ref. No.: **Used materials MPSA-11509** Date Sampled: **26-Jun-21** Source: **Pre-Strip / Botija Quarry / J.O Crusher**

Test Hole No.	1 (11.0cm)					
Coordinate (N, E)	982661, 538691					
Elevation (m)	81.51m					
Test Hole Volume Determination						
Sand Cone Apparatus No.	4					
Sand & Cone Date Calibrated	08.05.2021					
A. Mass of Sand in Container, Bef. Pouring (g)	7000					
B. Mass of Sand in Containerl, Aft. Pouring (g)	1878					
C. Mass of Sand in Funnel & Hole (g) (A-B)	5122					
D. Mass of Sand in Funnel (g) (frm Calib.)	1765					
E. Mass of Sand in Hole (g) (C-D)	3357					
F. Bulk Density of Sand (g/cm³) (frm Calib)	1.519					
G. Vol. of Test Hole (cm³) (E/F)	2210					
Water Content Determination (Laboratory)						
Method Used	D2216	☐	☐	☐	☐	☐
	D4643	☐	☐	☐	☐	☐
	D4959	☒	☐	☐	☐	☐
H. Mass of Container (g)	460					
I. Mass of Container+Moist Specimen (g)	1153					
J. Mass of Container+Dry Specimen (g)	1113					
K. Mass of Water (g) (I-J)	40					
L. Mass of Dry Specimen (g) (J-H)	653					
M. Water Content (%) (K/L)*100)	6.1					
Wet & Dry Density Determination (in-place)						
N. Moist Mass of Material from Hole (g)	4600					
O. Dry Mass of Material from Hole (g)	4334					
P. Wet Density of Tested Material (g/m³) (N/G)	2.081					
Q. Dry Density of Tested Material (g/m³) (O/G)	1.961					
R. In-Situ Compaction (%) (Q/S)*100	103					
Laboratory Compaction						
S. Max. Dry Density (g/m³)	1.907					
T. Opt. Moist. Cont. (%)	3.2					

Sample Identification		 	
1	Informacion General (<i>Informacion General</i>)		
	Sample number (<i>Numero de muestra</i>):	MPSA-SC-122	
	sampld date (<i>Fecha de muestreo</i>):	16-Jul-21	
2	Material Information (<i>Informacion del Material</i>)		
	Source (<i>Fuente</i>)	Sand Cycloning Plant/ CSF #4B	
	Work Area (<i>Area de Trabajo</i>)	TMF NSD SEC.1 Sand Cell N°11 (InPlace)	
	Borrow - Foundation - Excavation - Crusher - Fill - Site Investigation - Other: <i>Prestamo - Fundacion - Excavacion - Crusher - Relleno - Investigacion de Sitio - Otro:</i>		
	Fill Zone (specs 1824-363-CI-SPC-0003): <i>Zona de Material:</i>		
	Material Type <i>Tipo de Material</i>	Cyclone Sand	Density Test Sand-cone Method
	Remarks: <i>Comentarios: Received: 17:25hrs</i>		
	Used materials MPSA-14683		
	Stations (along dam center line) <i>Estaciones (Eje de Presa)</i>	Start sta.:	End Sta.:
	Coordinates - GPS or Survey <i>(Coordenadas - GPS o Topografia):</i>	N: 983295	E: 537239
	Depth used to estimate elevation: <i>(Profundidad a la que se tomo la muestra):</i>	110mm	
	Recorded Ground elevation: <i>(Elevacion del terreno)</i>	El. 46.47m	
Technician:	Name: YG/RH	Signature:	
Lab Supervisor:	Name: CG	Signature:	

Form No. 1824-QC-LST-057 Rv02 Dual language

MINA COBRE PANAMA

Density and Unit Weight of Soil in Place by Sand-Cone Method
(ASTM D1556)



Sample Type:	Zone 3	Technician:	YG/RH	Location:	TMF NSD SEC.1 Sand Cell N°11 (InPlace)
Lab. No:	MPSA-SC-122	Date Tested:	16-Jul-21	Source:	Sand Cycloning Plant/ CSF #4B
Fill Material Ref. No.:	Used materials MPSA-14683	Date Sampled:	16-Jul-21		

Test Hole No.	1 (11.0cm)					
Coordinate (N, E)	983295, 537239					
Elevation (m)	46.47m					
Test Hole Volume Determination						
Sand Cone Apparatus No.	4					
Sand & Cone Date Calibrated	08.05.2021					
A. Mass of Sand in Container, Bef. Pouring (g)	7000					
B. Mass of Sand in Containerl, Aft. Pouring (g)	1652					
C. Mass of Sand in Funnel & Hole (g) (A-B)	5348					
D. Mass of Sand in Funnel (g) (frm Calib.)	1765					
E. Mass of Sand in Hole (g) (C-D)	3583					
F. Bulk Density of Sand (g/cm³) (frm Calib)	1.519					
G. Vol. of Test Hole (cm³) (E/F)	2359					
Water Content Determination (Laboratory)						
Method Used	D2216	☐	☐	☐	☐	☐
	D4643	☐	☐	☐	☐	☐
	D4959	☒	☐	☐	☐	☐
H. Mass of Container (g)	643					
I. Mass of Container+Moist Specimen (g)	1094					
J. Mass of Container+Dry Specimen (g)	1047					
K. Mass of Water (g) (I-J)	48					
L. Mass of Dry Specimen (g) (J-H)	403					
M. Water Content (%) (K/L)*100)	11.8					
Wet & Dry Density Determination (in-place)						
N. Moist Mass of Material from Hole (g)	4105					
O. Dry Mass of Material from Hole (g)	3672					
P. Wet Density of Tested Material (g/m³) (N/G)	1.740					
Q. Dry Density of Tested Material (g/m³) (O/G)	1.557					
R. In-Situ Compaction (%) (Q/S)*100	99					
Laboratory Compaction						
S. Max. Dry Density (g/m³)	1.578					
T. Opt. Moist. Cont. (%)	20.1					

Sample Identification		 FIRST QUANTUM MINERALS LTD. Cobre Panamá	
1	Informacion General (Informacion General)		
	Sample number (Numero de muestra):	MPSA-SC-129	
	sampld date (Fecha de muestreo:)	19-Aug-21	
2	Material Information (Informacion del Material)		
	Source (Fuente)	SCP Sand Farm #4A (Stock Pile)	
	Work Area (Area de Trabajo)	TMF NSD SEC-3 Cell-16/17 (In Place)	
	Borrow - Foundation - Excavation - Crusher - Fill - Site Investigation - Other: Prestamo - Fundacion - Excavacion - Crusher - Relleno - Investigacion de Sitio - Otro:		
	Fill Zone (specs 1824-363-CI-SPC-0003): Zona de Material:		
	Material Type Tipo de Material	Arena Mecanica	Density Test Sand-cone Method
	Remarks: Comentarios: Hora de La muestra 14:20 hrs		
	Used materials MPSA-15686		
	Stations (along dam center line) Estaciones (Eje de Presa)	Start sta.:	End Sta.:
	Coordinates - GPS or Survey (Coordenadas - GPS o Topografia):	N: 983126	E: 536763
	Depth used to estimate elevation: (Profundidad a la que se tomo la muestra):	150 mm	
	Recorded Ground elevation: (Elevacion del terreno)	El. 66.05 m	
Technician:	Name: AP / DB	Signature:	
Lab Supervisor:	Name: CG	Signature:	

Form No. 1824-QC-LST-057 Rv02 Dual language

MINA COBRE PANAMA

Density and Unit Weight of Soil in Place by Sand-Cone Method
(ASTM D1556)



Sample Type: **Arena Mecanica**

Technician: **AP**

Location: **TMF NSD SEC-3 Cell-16/17 (In Place)**

Lab. No: **MPSA-SC-129**

Date Tested: **19-Aug-21**

Source: **SCP Sand Farm #4A (Stock Pile)**

Fill Material Ref. No.: **MPSA-14683**

Date Sampled: **19-Aug-21**

Used materials MPSA-15686	SC-129					
Coordinate (N, E)	983314 537388					
Elevation (m)	El. 66.05 m					
Test Hole Volume Determination						
Sand Cone Apparatus No.	1	1				
Name: DB / AP	19.08.2021					
A. Mass of Sand in Container, Bef. Pouring (kg)	7.000					
B. Mass of Sand in Containerl, Aft. Pouring (kg)	2.359					
C. Mass of Sand in Funnel & Hole (kg) (A-B)	4.641					
D. Mass of Sand in Funnel (kg) (frm Calib.)	1.765					
E. Mass of Sand in Hole (g) (C-D)	2.876					
F. Bulk Density of Sand (km/m ³) (frm Calib)	1518.0					
G. Vol. of Test Hole (m ³) (E/F)	0.0019					
Water Content Determination (Laboratory)						
Method Used	D2216	☒	☐	☐	☐	☐
	D4643	☐	☐	☐	☐	☐
	D4959	☐	☐	☐	☐	☐
H. Mass of Container (g)	645					
I. Mass of Container+Moist Specimen (g)	1144					
J. Mass of Container+Dry Specimen (g)	1105					
K. Mass of Water (g) (I-J)	39					
L. Mass of Dry Specimen (g) (J-H)	460					
M. Water Content (%) (K/L)*100)	8.5					
Wet & Dry Density Determination (in-place)						
N. Moist Mass of Material from Hole (kg)	3.436					
O. Dry Mass of Material from Hole (kg)	3.167					
P. Wet Density of Tested Material (kg/m ³) (N/G)	1813.58					
Q. Dry Density of Tested Material (Kg/m ³) (O/G)	1671.59					
R. In-Situ Compaction (%) (Q/S)*100	105.1					
Laboratory Compaction						
S. Max. Dry Density (kg/m ³)	1591.0					
T. Opt. Moist. Cont. (%)	18.3					

Sample Identification		 FIRST QUANTUM MINERALS LTD. Cobre Panamá	
1	Informacion General (Informacion General)		
	Sample number (Numero de muestra):	MPSA-SC-136	
	sampled date (Fecha de muestreo:)	14-Sep-21	
2	Material Information (Informacion del Material)		
	Source (Fuente)	Sand Cycloning Plant	
	Work Area (Area de Trabajo)	TMF NSD Sec.1 Sand Cell N°08 Berma Norte (In Place)	
	Borrow - Foundation - Excavation - Crusher - Fill - Site Investigation - Other: Prestamo - Fundacion - Excavacion - Crusher - Relleno - Investigacion de Sitio - Otro:		
	Fill Zone (specs 1824-363-CI-SPC-0003): Zona de Material:		
	Material Type Tipo de Material	Cyclone Sand	Density Test cone Method for DRI Test Sand- Test
	Remarks: Comentarios: Received: 17:20hrs		
	Using materials MPSA-RT-16891		
	Stations (along dam center line) Estaciones (Eje de Presa)	Start sta.:	End Sta.:
	Coordinates - GPS or Survey (Coordenadas - GPS o Topografia):	N: 983313	E: 537624
	Depth used to estimate elevation: (Profundidad a la que se tomo la muestra):	110mm	
	Recorded Ground elevation: (Elevacion del terreno)	El. 68.54m	
Technician:	Name: JAC/GF	Signature:	
Lab Supervisor:	Name: CG	Signature:	

Form No. 1824-QC-LST-057 Rv02 Dual language

MINA COBRE PANAMA

Density and Unit Weight of Soil in Place by Sand-Cone Method
(ASTM D1556)



Sample Type: **Cyclone Sand**

Technician: **JAC**

Location: **TMF NSD Sec.1 Sand Cell N°08 Berma Norte (In Place)**

Lab. No: **MPSA-SC-136**

Date Tested: **14-Sep-21**

Source: **Sand Cycloning Plant**

Fill Material Ref. No.: **MPSA- 16891**

Date Sampled: **14-Sep-21**

		110mm					
Coordinate (N, E)		983113 537624					
Elevation (m)		68.54m					
Test Hole Volume Determination							
Sand Cone Apparatus No.		1	1				
A. Mass of Sand in Container, Bef. Pouring (g)		7000					
B. Mass of Sand in Containerl, Aft. Pouring (g)		1400					
C. Mass of Sand in Funnel & Hole (g) (A-B)		5600					
D. Mass of Sand in Funnel (g) (frm Calib.)		1765					
E. Mass of Sand in Hole (g) (C-D)		3835					
F. Bulk Density of Sand (cm ³ /g) (frm Calib)		1.518					
G. Vol. of Test Hole (cm ³) (E/F)		2526					
Water Content Determination (Laboratory)							
Method Used	D2216	☒	☐	☐	☐	☐	☐
	D4643	☐	☐	☐	☐	☐	☐
	D4959	☒	☒	☐	☐	☐	☐
H. Mass of Container (g)		481					
I. Mass of Container+Moist Specimen (g)		1278					
J. Mass of Container+Dry Specimen (g)		1219					
K. Mass of Water (g) (I-J)		59					
L. Mass of Dry Specimen (g) (J-H)		738					
M. Water Content (%) (K/L)*100)		8.0					
Wet & Dry Density Determination (in-place)							
N. Moist Mass of Material from Hole (kg)		4044					
O. Dry Mass of Material from Hole (kg)		3744					
P. Wet Density of Tested Material (kg/m ³) (N/G)		1.601					
Q. Dry Density of Tested Material (Kg/m ³) (O/G)		1.482					
R. In-Situ Compaction (%) (Q/S)*100		97.7					
Laboratory Compaction							
S. Max. Dry Density (kg/m ³)		1.517					
T. Opt. Moist. Cont. (%)		20.4					

Sample Identification		 FIRST QUANTUM MINERALS LTD. Cobre Panamá	
1	Informacion General (<i>Informacion General</i>)		
	Sample number (<i>Numero de muestra</i>):	MPSA-SC-146	
	sampld date (<i>Fecha de muestreo</i>):	2-Oct-21	
2	Material Information (<i>Informacion del Material</i>)		
	Source (<i>Fuente</i>)	Sand Cyclone Plan/ CSF-6	
	Work Area (<i>Area de Trabajo</i>)	TMF ESD WRP-3 Sand Cell Nº 19/30 Plataforma (In Place)	
	Borrow - Foundation - Excavation - Crusher - Fill - Site Investigation - Other: <i>Prestamo - Fundacion - Excavacion - Crusher - Relleno - Investigacion de Sitio - Otro:</i>		
	Fill Zone (specs 1824-363-CI-SPC-0003): <i>Zona de Material:</i>		
	Material Type <i>Tipo de Material</i>	Cyclone Sand	Density Test cone Method for DRI Test
	Remarks: <i>Comentarios: Received: 14:25hrs</i>		
	Using materials MPSA-RT-17424		
	Stations (along dam center line) <i>Estaciones (Eje de Presa)</i>	Start sta.:	End Sta.:
	Coordinates - GPS or Survey <i>(Coordenadas - GPS o Topografia):</i>	N: 981295	E: 538768
	Depth used to estimate elevation: <i>(Profundidad a la que se tomo la muestra):</i>	130 mm	
	Recorded Ground elevation: <i>(Elevacion del terreno)</i>	79.36	
Technician:	Name: FM/	Signature:	
Lab Supervisor:	Name: CG	Signature:	

Form No. 1824-QC-LST-057 Rv02 Dual language

MINA COBRE PANAMA

Density and Unit Weight of Soil in Place by Sand-Cone Method
(ASTM D1556)



Sample Type:	Cyclone Sand	Technician:	FM	Location:	TMF ESD WRP-3 Sand Cell N° 19/30 Plataforma (In Place)
Lab. No:	MPSA-SC-146	Date Tested:	2-Oct-21	Source:	Sand Cyclone Plan/ CSF-6
Fill Material Ref. No.:	17424	Date Sampled:	2-Oct-21		

	130mm					
Coordinate (N, E)	981295 538768					
Elevation (m)	79.36					
Test Hole Volume Determination						
Sand Cone Apparatus No.	1	1				
A. Mass of Sand in Container, Bef. Pouring (g)	7000					
B. Mass of Sand in Containerl, Aft. Pouring (g)	1833					
C. Mass of Sand in Funnel & Hole (g) (A-B)	5167					
D. Mass of Sand in Funnel (g) (frm Calib.)	1765					
E. Mass of Sand in Hole (g) (C-D)	3402					
F. Bulk Density of Sand (cm ³ /g) (frm Calib)	1.519					
G. Vol. of Test Hole (cm ³) (E/F)	2240					
Water Content Determination (Laboratory)						
Method Used	D2216	☒	☐	☐	☐	☐
	D4643	☐	☐	☐	☐	☐
	D4959	☒	☒	☐	☐	☐
H. Mass of Container (g)	487					
I. Mass of Container+Moist Specimen (g)	1270					
J. Mass of Container+Dry Specimen (g)	1187					
K. Mass of Water (g) (I-J)	83					
L. Mass of Dry Specimen (g) (J-H)	700					
M. Water Content (%) (K/L)*100)	11.9					
Wet & Dry Density Determination (in-place)						
N. Moist Mass of Material from Hole (kg)	3967					
O. Dry Mass of Material from Hole (kg)	3545					
P. Wet Density of Tested Material (kg/m ³) (N/G)	1.771					
Q. Dry Density of Tested Material (Kg/m ³) (O/G)	1.583					
R. In-Situ Compaction (%) (Q/S)*100	102.5					
Laboratory Compaction						
S. Max. Dry Density (kg/m ³)	1.544					
T. Opt. Moist. Cont. (%)	17.9					

Sample Identification		 FIRST QUANTUM MINERALS LTD. Cobre Panamá	
1	Informacion General (Informacion General)		
	Sample number (Numero de muestra):	MPSA-SC-188	
	sampled date (Fecha de muestreo:)	10-Nov-21	
2	Material Information (Informacion del Material)		
	Source (Fuente)	Sand Cyclone Plant	
	Work Area (Area de Trabajo)	TMF NSD SEC-1 Sand Cell N.09 (In Place)	
	Borrow - Foundation - Excavation - Crusher - Fill - Site Investigation - Other: Prestamo - Fundacion - Excavacion - Crusher - Relleno - Investigacion de Sitio - Otro:		
	Fill Zone (specs 1824-363-CI-SPC-0003): Zona de Material:		
	Material Type Tipo de Material	Cyclone Sand	
	Remarks: Comentarios: Received: 13:00 hrs		
	Used materials MPSA-19421		
	Stations (along dam center line) Estaciones (Eje de Presa)	Start sta.:	End Sta.:
	Coordinates - GPS or Survey (Coordenadas - GPS o Topografia):	N: 983240	E: 537558
	Depth used to estimate elevation: (Profundidad a la que se tomo la muestra):	110 mm	
	Recorded Ground elevation: (Elevacion del terreno)	73.92	
Technician:	Name: Personal de laboratorio.	Signature:	
Lab Supervisor:	Name: CG	Signature:	

Form No. 1824-QC-LST-057 Rv02 Dual language

MINA COBRE PANAMA

Density and Unit Weight of Soil in Place by Sand-Cone Method
(ASTM D1556)



Sample Type:

Cyclone Sand

 Technician:

YG/DS

 Location:

TMF NSD SEC-1 Sand Cell N.09 (In Place)

Lab. No.:

MPSA-SC-188

 Date Tested:

10-Nov-21

 Source:

Sand Cyclone Plant

Fill Material Ref. No.:

Used materials MPSA-19421

 Date Sampled:

10-Nov-21

Prueba No.	#1					
Coordenadas (N, E)	983240 537558					
Elevacion (m)	73.92					
Determinación del volumen del hueco de prueba						
Aparato de cono de arena No.	#1					
Fecha de calibracio del cono	01/11/2021					
A. Masa de arena en contenedor, Ant. Vertido (kg)	6.788					
B. Masa de arena en contenedor, Des. Vertido (kg)	1.359					
C. Masa de arena Utilizada (kg) (A-B)	5.429					
D. Masa de arena en embudo (kg) (frm Calib).	1.753					
E. Masa de arena en el Hueco (Kg) (CD)	3.676					
F. Densidad aparente de la arena (km / m3) (frm Calib)	1533.0					
G. Vol. de l hueco de prueba (m3) (E/F)	0.002398					
Determinación del contenido de Humedad (laboratorio)						
Método utilizado	D2216	☐	☐	☐	☐	☐
	D4643	☐	☐	☐	☐	☐
	D4959	☐	☐	☐	☐	☐
H. Masa del contenedor (g)	336					
I. Masa del recipiente + muestra húmeda (g)	757					
J. Masa del recipiente + Muestra seca (g)	710					
K. Masa de agua (g) (I-J)	47					
L. Masa de muestra seca (g) (J-H)	374					
M. Contenido de agua (%) (K/L)*100	12.6					
Determinación de densidad húmeda y seca (in situ)						
N. Masa húmeda de material del orificio (kg)	4.260					
O. Masa seca de material en el hueco (kg)	3.784					
P. Densidad húmeda del material probado (kg/m³) (N/G)	1776.55					
Q. Densidad seca del material probado (Kg/m³) (O/G)	1578.04					
R. Compactación in situ (%) (Q/S)*100	101.4					
Compactación de laboratorio						
S. Max. Densidad seca (kg/m³)	1556.0	DD	MC	MDD		NOTA: Equipo utilizado / 30436 de (ITP)
T. Opt. Húmedo. Cont. (%)	18.3	1621.0	14.3	104.2		

Sieve Analysis Results (Fines) - June to November

Sample Identification		 FIRST QUANTUM MINERALS LTD. Cobre Panamá	
1	Informacion General (Informacion General)		
	Sample number (Numero de muestra):	MPSA-RT-13662	
	sampled date (Fecha de muestreo):	10-Jun-21	
2	Material Information (Informacion del Material)		
	Source (Fuente)	Ciclone Sand Farm #4A	
	Work Area (Area de Trabajo)	TMF NSD Sec.3 Sand Cell N°20 West Berm 1st. Layer (inplace)	
	Borrow - Foundation - Excavation - Crusher - Fill - Site Investigation - Other: Plant <i>Prestamo - Fundacion - Excavacion - Crusher - Relleno - Investigacion de Sitio - Otro:</i>		
	Fill Zone (specs 1824-363-CI-SPC-0003): <i>Zona de Material:</i>		
	Material Type <i>Tipo de Material</i>	Cyclone Sand (Mecanical)	% Fines
	Remarks: <i>Comentarios:</i> received: 09:14hrs, Completed Test: 09:40hrs		
	Mechanically placed and compacted.		
		Start sta.:	End Sta.:
	Coordinates - GPS or Survey <i>(Coordenadas - GPS o Topografia):</i>	N: 983116	E: 536440
	Depth used to estimate elevation: <i>(Profundidad a la que se tomo la muestra):</i>	300mm	
	Recorded Ground elevation: <i>(Elevacion del terreno)</i>	Elev. 49.90m	
Technician:	Name: YG	Signature:	
Lab Supervisor:	Name: CG	Signature:	

MINA COBRE PANAMA
Material Finer than 75mic. Sieve in Soil by Washing (ASTM D1140)



Cobre Panamá

Location: **TMF NSD Sec.3 Sand Cell N°20 West Berm
1st. Layer (inplace)**

Sample Type: **Cyclone Sand (Hydraulic)** Technician: **EG**

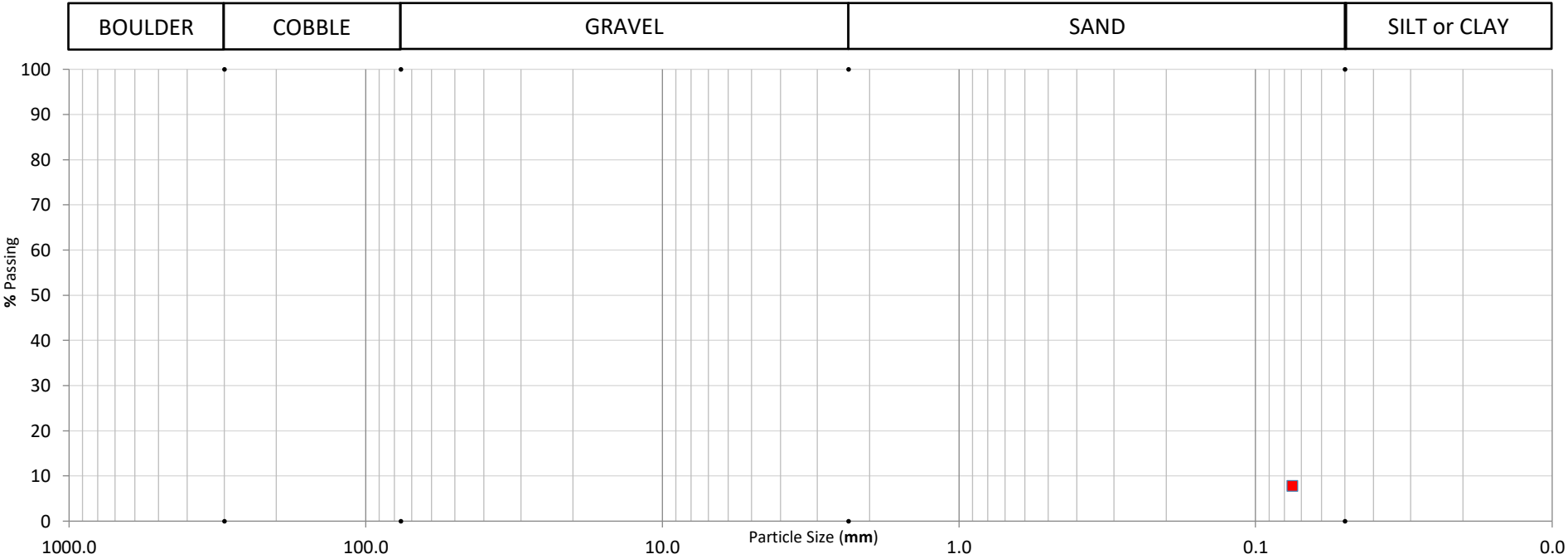
Sample No: **MPSA-RT-13662** Date Tested: **10-Jun-21**

Source: **Ciclone Sand Farm #4A** Date Sampled: **10-Jun-21**

Other: **% Fines**

Wet Weight (g):	258.19
Moisture (%):	12.2
Orig. Dry Wt. (g):	230.08
Total Solid (%):	
Washed Oven Dry Wt. (g):	212.38
Washed Loss (g):	
Specific Gravity :	

Gravel	
Sand	92.3
Fines	7.7
Fineness Modulus	0.92



Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
24"	600.0						
18"	450.0						
12"	300.0						
8"	200.0						
6"	150.0						
5"	125.0						
4"	100.0						
3"	75.0						
2 1/2"	63.0						
2"	50.0						
1.5"	37.5						
1"	25.0						
3/4"	19.0						
1/2"	12.5						
3/8"	9.5						
1/4"	6.3						

Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
#4	4.75						
#8	2.36						
#10	2.00						
#16	1.18						
#20	0.85						
#30	0.60						
#40	0.425						
#50	0.30						
#60	0.25						
#100	0.15						
#200	0.075			212.38	212.38	92.3	7.7

Sample Identification		 FIRST QUANTUM MINERALS LTD. Cobre Panamá	
	Informacion General (Informacion General)		
	Sample number (Numero de muestra):	MPSA-RT-15237	
	sampled date (Fecha de muestreo):	22-Jul-21	
	Material Information (Informacion del Material)		
	Source (Fuente)	Sand Cycloning Plant	
	Work Area (Area de Trabajo)	TMF NSD Sec.2 Sand Cell N° 13 Berma Norte Capa #1 (inplace)	
	Borrow - Foundation - Excavation - Crusher - Fill - Site Investigation - Other: Plant Prestamo - Fundacion - Excavacion - Crusher - Relleno - Investigacion de Sitio - Otro:		
	Fill Zone (specs 1824-363-CI-SPC-0003): Zona de Material:		
	Material Type Tipo de Material	Cyclone Sand (Hydraulic)	% Fines
	Remarks: Comentarios: Received: 21:45 hrs, Completed test: 23:55 hrs		
		Start sta.:	End Sta.:
	Coordinates - GPS or Survey (Coordenadas - GPS o Topografia):	N: 983257	E: 537082
	Depth used to estimate elevation: (Profundidad a la que se tomo la muestra):	300 mm	
	Recorded Ground elevation: (Elevacion del terreno)	54.46 m	
Technician:	Name: Luis (ITP)	Signature:	
Lab Supervisor:	Name: CG	Signature:	

Form No. 1824-QC-LST-057 Rv02 Dual language

MINA COBRE PANAMA
Material Finer than 75mic. Sieve in Soil by Washing (ASTM D1140)



Sample Type: Cyclone Sand (Hydraulic) Technician: EG / RH

Sample No: MPSA-RT-15237 Date Tested: 22-Jul-21

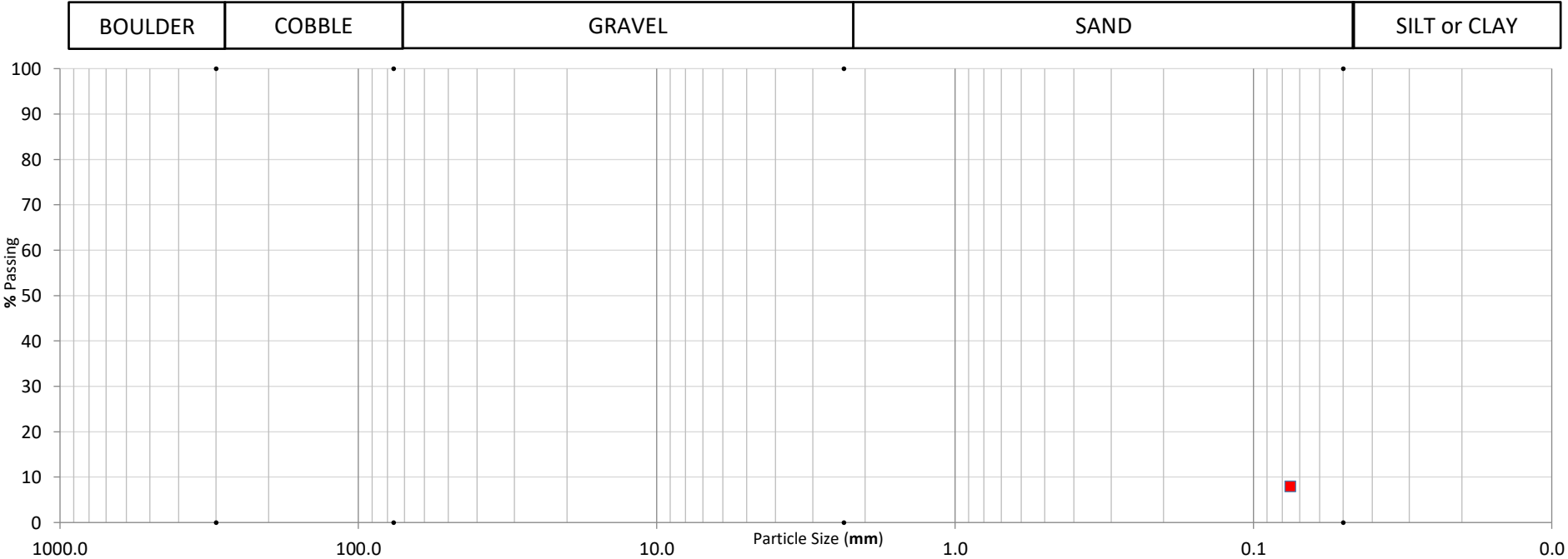
Source: Sand Cycloning Plant Date Sampled: 22-Jul-21

Location: TMF NSD Sec.2 Sand Cell N° 13 Berma Norte Capa #1 (inplace)

Other: % Fines

Wet Weight (g):	307.32
Moisture (%):	9.7
Orig. Dry Wt. (g):	280.10
Total Solid (%):	
Washed Oven Dry Wt. (g):	258.13
Washed Loss (g):	
Specific Gravity :	

Gravel	
Sand	92.2
Fines	7.8
Fineness Modulus	0.92



Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
24"	600.0						
18"	450.0						
12"	300.0						
8"	200.0						
6"	150.0						
5"	125.0						
4"	100.0						
3"	75.0						
2 1/2"	63.0						
2"	50.0						
1.5"	37.5						
1"	25.0						
3/4"	19.0						
1/2"	12.5						
3/8"	9.5						
1/4"	6.3						

Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
#4	4.75						
#8	2.36						
#10	2.00						
#16	1.18						
#20	0.85						
#30	0.60						
#40	0.425						
#50	0.30						
#60	0.25						
#100	0.15						
#200	0.075			258.13	258.13	92.2	7.8

Sample Identification		 FIRST QUANTUM MINERALS LTD. Cobre Panamá	
	Informacion General (Informacion General)		
	Sample number (Numero de muestra):	MPSA-RT-16076	
	sampled date (Fecha de muestreo):	15-Aug-21	
	Material Information (Informacion del Material)		
	Source (Fuente)	Sand Cycloning Plant	
	Work Area (Area de Trabajo)	TMF NSD Sec.1 Sand Cell N° 08 Berm North (inplace). Layer 1	
	Borrow - Foundation - Excavation - Crusher - Fill - Site Investigation - Other: Plant Prestamo - Fundacion - Excavacion - Crusher - Relleno - Investigacion de Sitio - Otro:		
	Fill Zone (specs 1824-363-CI-SPC-0003): Zona de Material:		
	Material Type Tipo de Material	Cyclone Sand (Hydraulic)	% Fines
	Remarks: Comentarios: Received: 23:40 hrs, Completed test: 01:25 hrs (16-08-2021)		
		Start sta.:	End Sta.:
	Coordinates - GPS or Survey (Coordenadas - GPS o Topografia):	N: 983345	E: 537632
	Depth used to estimate elevation: (Profundidad a la que se tomo la muestra):	300mm	
	Recorded Ground elevation: (Elevacion del terreno)	60.34m	
Technician:	Name: DS (ITP)	Signature:	
Lab Supervisor:	Name: CG	Signature:	

Form No. 1824-QC-LST-057 Rv02 Dual language

MINA COBRE PANAMA
Material Finer than 75mic. Sieve in Soil by Washing (ASTM D1140)



Sample Type: Cyclone Sand (Hydraulic) Technician: JS

Sample No: MPSA-RT-16076 Date Tested: 16-Aug-21

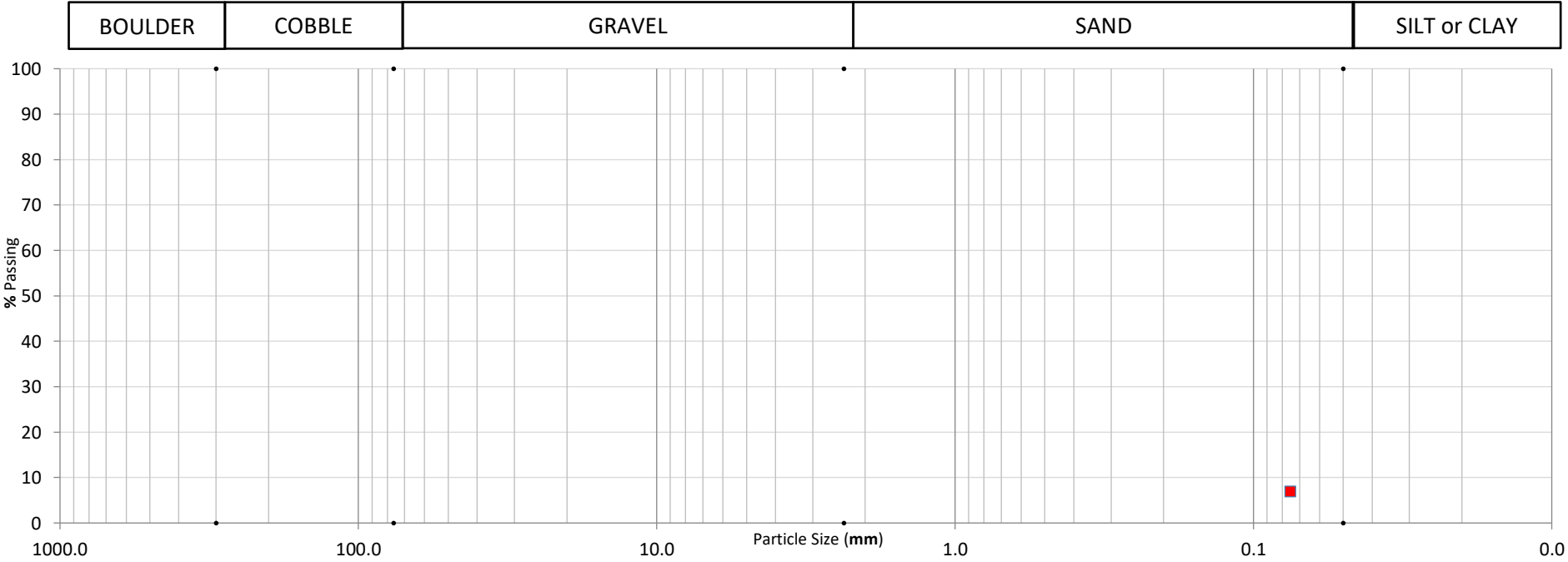
Source: Sand Cycloning Plant Date Sampled: 15-Aug-21

Location: TMF NSD Sec.1 Sand Cell N° 08 Berm North (inplace). Layer 1

Other: % Fines

Wet Weight (g):	317.20
Moisture (%):	13.5
Orig. Dry Wt. (g):	279.56
Total Solid (%):	
Washed Oven Dry Wt. (g):	260.27
Washed Loss (g):	
Specific Gravity :	

Gravel	
Sand	93.1
Fines	6.9
Fineness Modulus	0.93



Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
24"	600.0						
18"	450.0						
12"	300.0						
8"	200.0						
6"	150.0						
5"	125.0						
4"	100.0						
3"	75.0						
2 1/2"	63.0						
2"	50.0						
1.5"	37.5						
1"	25.0						
3/4"	19.0						
1/2"	12.5						
3/8"	9.5						
1/4"	6.3						

Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
#4	4.75						
#8	2.36						
#10	2.00						
#16	1.18						
#20	0.85						
#30	0.60						
#40	0.425						
#50	0.30						
#60	0.25						
#100	0.15						
#200	0.075			260.27	260.27	93.1	6.9

Sample Identification		 FIRST QUANTUM MINERALS LTD.		Cobre Panamá
Informacion General (<i>Informacion General</i>)				
Sample number (<i>Numero de muestra</i>):		MPSA-RT-18023		
sampled date (<i>Fecha de muestreo</i>):		30-Sep-21		
Material Information (<i>Informacion del Material</i>)				
Source (<i>Fuente</i>)		Sand Cycloning Plant		
Work Area (<i>Area de Trabajo</i>)		TMF NSD Sec.4 Sand Cell Nº 28 (Capa 1).		
Borrow - Foundation - Excavation - Crusher - Fill - Site Investigation - Other: Plant <i>Prestamo - Fundacion - Excavacion - Crusher - Relleno - Investigacion de Sitio - Otro:</i>				
Fill Zone (specs 1824-363-CI-SPC-0003): <i>Zona de Material:</i>				
Material Type <i>Tipo de Material</i>		Cyclone Sand (Hydraulic)	% Fines	
Remarks: <i>Comentarios:</i> Received: 10:25 hrs, Completed test: 13:40 hrs (30.09.2021)				
(Hydraulic placed and compacted)				
		Start sta.:	End Sta.:	
Coordinates - GPS or Survey <i>(Coordenadas - GPS o Topografia):</i>		N: 982927	E: 535707	
Depth used to estimate elevation: <i>(Profundidad a la que se tomo la muestra):</i>		400mm		
Recorded Ground elevation: <i>(Elevacion del terreno)</i>		83.13 mm		
Technician:	Name: Francisco (ITP)		Signature:	
Lab Supervisor:	Name: CG		Signature:	

MINA COBRE PANAMA
Material Finer than 75mic. Sieve in Soil by Washing (ASTM D1140)



Sample Type: Cyclone Sand (Hydraulic) Technician: BG

Sample No: MPSA-RT-18023 Date Tested: 30-Sep-21

Source: Sand Cycloning Plant Date Sampled: 30-Sep-21

Location: TMF NSD Sec.4 Sand Cell N° 28 (Capa 1).

Other: % Fines

Wet Weight (g): 289.32

Moisture (%):

Orig. Dry Wt. (g): 240.39

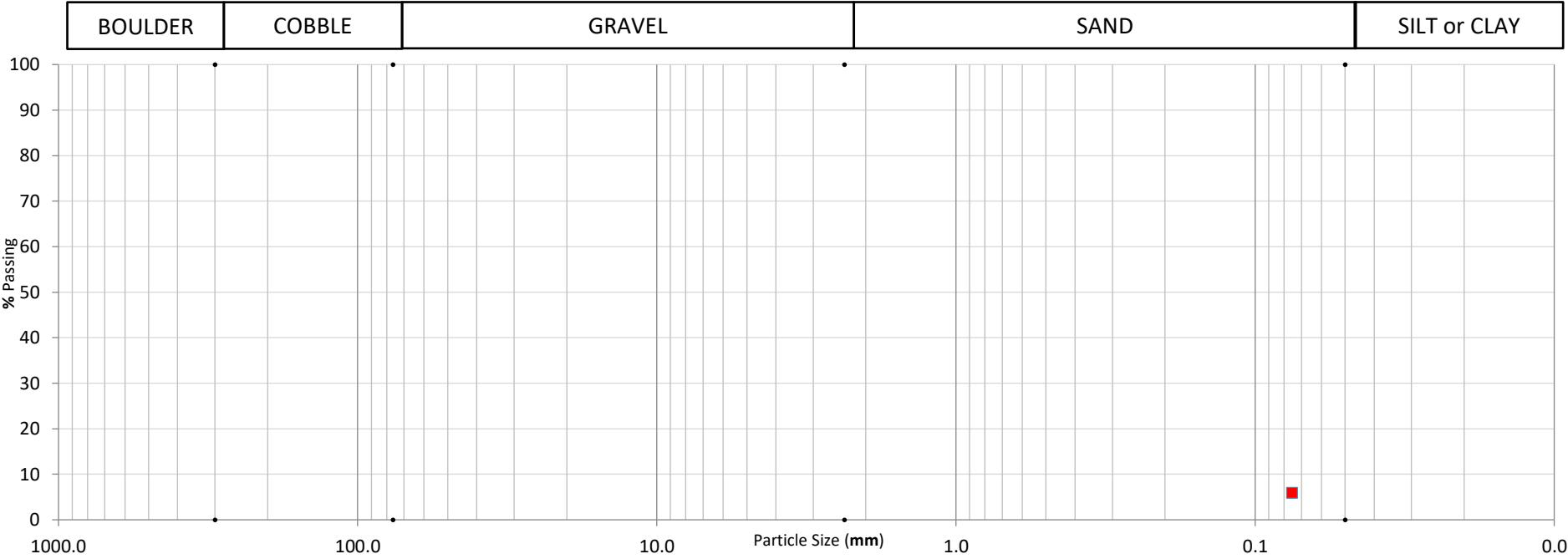
Total Solid (%):

Washed Oven Dry Wt. (g): 226.36

Washed Loss (g):

Specific Gravity :

Gravel	
Sand	94.2
Fines	5.8
Fineness Modulus	0.94



Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
24"	600.0						
18"	450.0						
12"	300.0						
8"	200.0						
6"	150.0						
5"	125.0						
4"	100.0						
3"	75.0						
2 1/2"	63.0						
2"	50.0						
1.5"	37.5						
1"	25.0						
3/4"	19.0						
1/2"	12.5						
3/8"	9.5						
1/4"	6.3						

Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
#4	4.75						
#8	2.36						
#10	2.00						
#16	1.18						
#20	0.85						
#30	0.60						
#40	0.425						
#50	0.30						
#60	0.25						
#100	0.15						
#200	0.075			226.36	226.36	94.2	5.8

Sample Identification		 FIRST QUANTUM MINERALS LTD.		Cobre Panamá
Informacion General (<i>Informacion General</i>)				
Sample number (<i>Numero de muestra</i>):		MPSA-RT-18024		
sampled date (<i>Fecha de muestreo</i>):		30-Sep-21		
Material Information (<i>Informacion del Material</i>)				
Source (<i>Fuente</i>)		Sand Cycloning Plant		
Work Area (<i>Area de Trabajo</i>)		TMF NSD Sec.4 Sand Cell Nº 28 (Capa 1).		
Borrow - Foundation - Excavation - Crusher - Fill - Site Investigation - Other: Plant <i>Prestamo - Fundacion - Excavacion - Crusher - Relleno - Investigacion de Sitio - Otro:</i>				
Fill Zone (specs 1824-363-CI-SPC-0003): <i>Zona de Material:</i>				
Material Type <i>Tipo de Material</i>		Cyclone Sand (Hydraulic)	% Fines	
Remarks: <i>Comentarios:</i> Received: 10:25 hrs, Completed test: 13:40 hrs (30.09.2021)				
(Hydraulic placed and compacted)				
		Start sta.:	End Sta.:	
Coordinates - GPS or Survey (<i>Coordenadas - GPS o Topografia</i>):		N: 982927	E: 535707	
Depth used to estimate elevation: (<i>Profundidad a la que se tomo la muestra</i>):		700mm		
Recorded Ground elevation: (<i>Elevacion del terreno</i>)		83.13 mm		
Technician:	Name: Francisco (ITP)		Signature:	
Lab Supervisor:	Name: CG		Signature:	

MINA COBRE PANAMA
Material Finer than 75mic. Sieve in Soil by Washing (ASTM D1140)



Sample Type: Cyclone Sand (Hydraulic) Technician: BG

Sample No: MPSA-RT-18024 Date Tested: 30-Sep-21

Source: Sand Cycloning Plant Date Sampled: 30-Sep-21

Location: TMF NSD Sec.4 Sand Cell N° 28 (Capa 1).

Other: % Fines

Wet Weight (g): 278.08

Moisture (%):

Orig. Dry Wt. (g): 246.00

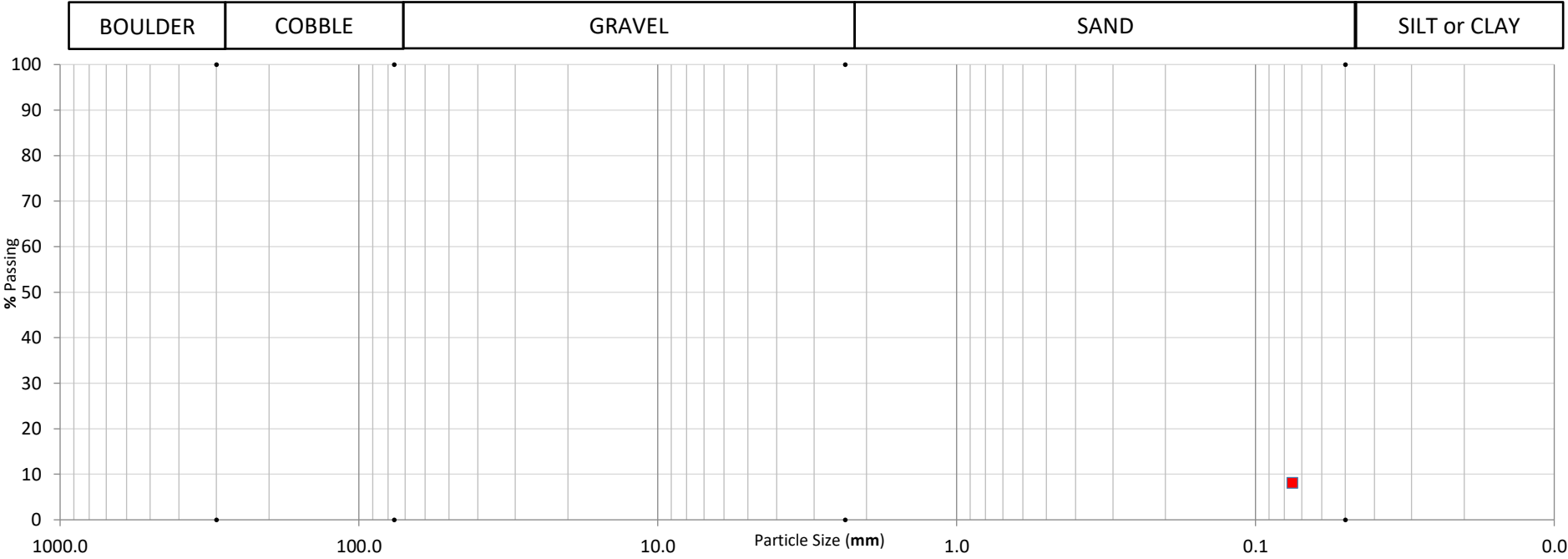
Total Solid (%):

Washed Oven Dry Wt. (g): 226.20

Washed Loss (g):

Specific Gravity :

Gravel	
Sand	92.0
Fines	8.0
Fineness Modulus	0.92



Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
24"	600.0						
18"	450.0						
12"	300.0						
8"	200.0						
6"	150.0						
5"	125.0						
4"	100.0						
3"	75.0						
2 1/2"	63.0						
2"	50.0						
1.5"	37.5						
1"	25.0						
3/4"	19.0						
1/2"	12.5						
3/8"	9.5						
1/4"	6.3						

Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
#4	4.75						
#8	2.36						
#10	2.00						
#16	1.18						
#20	0.85						
#30	0.60						
#40	0.425						
#50	0.30						
#60	0.25						
#100	0.15						
#200	0.075			226.20	226.20	92.0	8.0

Sample Identification		 FIRST QUANTUM MINERALS LTD. Cobre Panamá	
Informacion General (<i>Informacion General</i>)			
Sample number (<i>Numero de muestra</i>):		MPSA-RT-18025	
sampled date (<i>Fecha de muestreo</i>):		30-Sep-21	
Material Information (<i>Informacion del Material</i>)			
Source (<i>Fuente</i>)	Sand Cycloning Plant		
Work Area (<i>Area de Trabajo</i>)	TMF NSD Sec.4 Sand Cell Nº 28 (Capa 1).		
Borrow - Foundation - Excavation - Crusher - Fill - Site Investigation - Other: Plant <i>Prestamo - Fundacion - Excavacion - Crusher - Relleno - Investigacion de Sitio - Otro:</i>			
Fill Zone (specs 1824-363-CI-SPC-0003): <i>Zona de Material:</i>			
Material Type <i>Tipo de Material</i>		Cyclone Sand (Hydraulic)	% Fines
Remarks: <i>Comentarios:</i> Received: 10:25 hrs, Completed test: 13:40 hrs (30.09.2021)			
(Hydraulic placed and compacted)			
		Start sta.:	End Sta.:
Coordinates - GPS or Survey (<i>Coordenadas - GPS o Topografia</i>):		N: 982927	E: 535707
Depth used to estimate elevation: (<i>Profundidad a la que se tomo la muestra</i>):		1000mm	
Recorded Ground elevation: (<i>Elevacion del terreno</i>)		83.13 mm	
Technician:	Name: Francisco (ITP)	Signature:	
Lab Supervisor:	Name: CG	Signature:	

MINA COBRE PANAMA
Material Finer than 75mic. Sieve in Soil by Washing (ASTM D1140)



Sample Type:

Cyclone Sand (Hydraulic)

 Technician:

BG

Sample No:

MPSA-RT-18025

 Date Tested:

30-Sep-21

Source:

Sand Cycloning Plant

 Date Sampled:

30-Sep-21

Location:

TMF NSD Sec.4 Sand Cell N° 28 (Capa 1).

Other:

% Fines

Wet Weight (g):

286.76

Moisture (%):

Orig. Dry Wt. (g):

257.23

Total Solid (%):

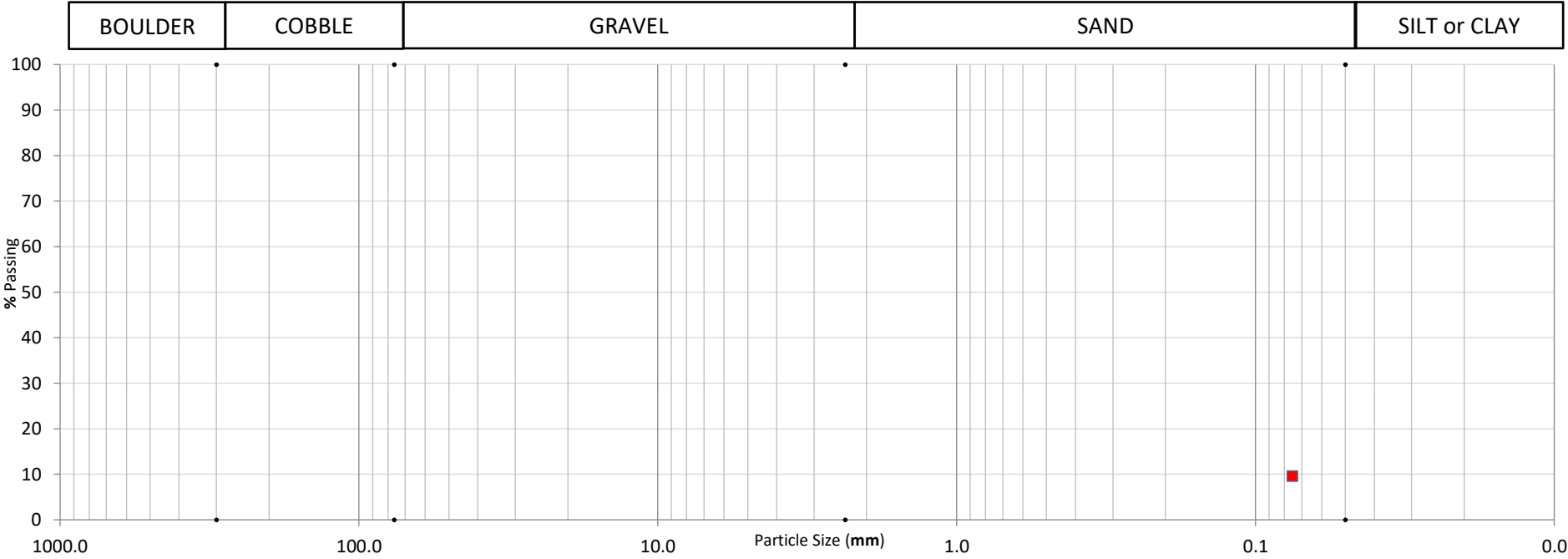
Washed Oven Dry Wt. (g):

232.66

Washed Loss (g):

Specific Gravity :

Gravel	
Sand	90.4
Fines	9.6
Fineness Modulus	0.90



Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
24"	600.0						
18"	450.0						
12"	300.0						
8"	200.0						
6"	150.0						
5"	125.0						
4"	100.0						
3"	75.0						
2 1/2"	63.0						
2"	50.0						
1.5"	37.5						
1"	25.0						
3/4"	19.0						
1/2"	12.5						
3/8"	9.5						
1/4"	6.3						

Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
#4	4.75						
#8	2.36						
#10	2.00						
#16	1.18						
#20	0.85						
#30	0.60						
#40	0.425						
#50	0.30						
#60	0.25						
#100	0.15						
#200	0.075			232.66	232.66	90.4	9.6

Sample Identification		 FIRST QUANTUM MINERALS LTD.		Cobre Panamá
Informacion General (<i>Informacion General</i>)				
Sample number (<i>Numero de muestra</i>):		MPSA-RT-18026		
sampled date (<i>Fecha de muestreo</i>):		30-Sep-21		
Material Information (<i>Informacion del Material</i>)				
Source (<i>Fuente</i>)		Sand Cycloning Plant		
Work Area (<i>Area de Trabajo</i>)		TMF NSD Sec.4 Sand Cell Nº 28 (Capa 1).		
Borrow - Foundation - Excavation - Crusher - Fill - Site Investigation - Other: Plant <i>Prestamo - Fundacion - Excavacion - Crusher - Relleno - Investigacion de Sitio - Otro:</i>				
Fill Zone (specs 1824-363-CI-SPC-0003): <i>Zona de Material:</i>				
Material Type <i>Tipo de Material</i>		Cyclone Sand (Hydraulic)	% Fines	
Remarks: <i>Comentarios:</i> Received: 10:25 hrs, Completed test: 13:40 hrs (30.09.2021)				
(Hydraulic placed and compacted)				
		Start sta.:	End Sta.:	
Coordinates - GPS or Survey <i>(Coordenadas - GPS o Topografia):</i>		N: 982927	E: 535707	
Depth used to estimate elevation: <i>(Profundidad a la que se tomo la muestra):</i>		1300mm		
Recorded Ground elevation: <i>(Elevacion del terreno)</i>		83.13 mm		
Technician:	Name: Francisco (ITP)		Signature:	
Lab Supervisor:	Name: CG		Signature:	

MINA COBRE PANAMA
Material Finer than 75mic. Sieve in Soil by Washing (ASTM D1140)



Sample Type: Cyclone Sand (Hydraulic) Technician: BG

Sample No: MPSA-RT-18026 Date Tested: 30-Sep-21

Source: Sand Cycloning Plant Date Sampled: 30-Sep-21

Location: TMF NSD Sec.4 Sand Cell N° 28 (Capa 1).

Other: % Fines

Wet Weight (g): 285.99

Moisture (%):

Orig. Dry Wt. (g): 256.15

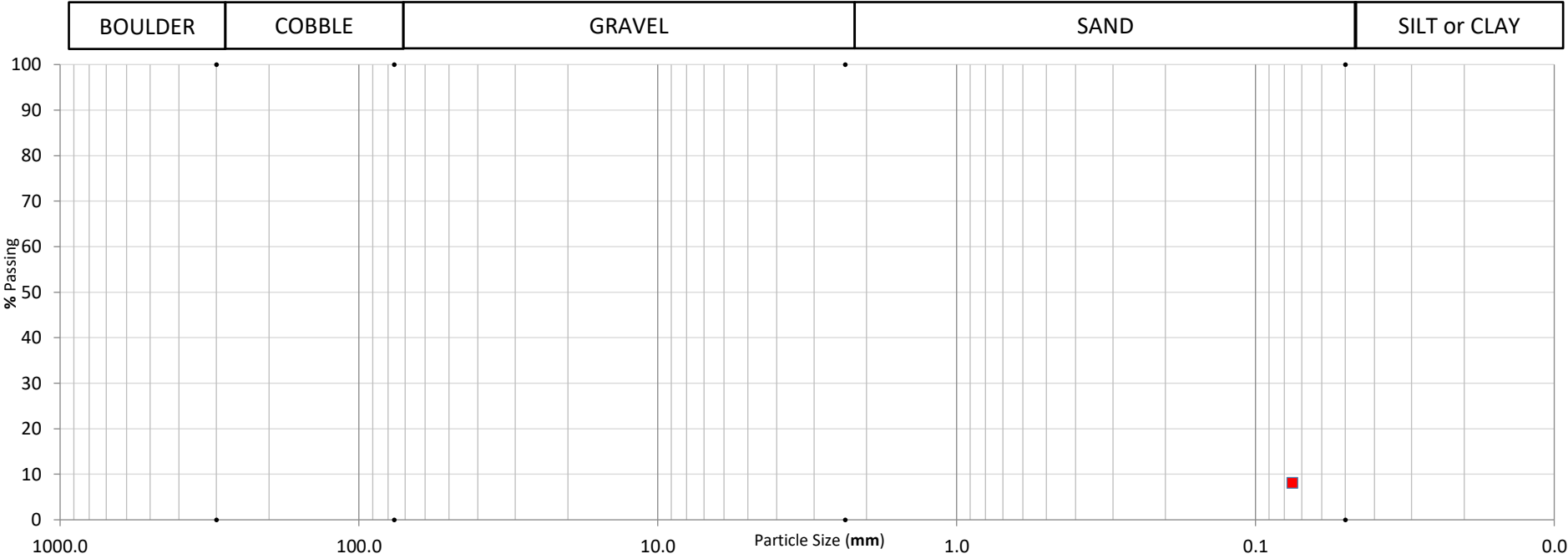
Total Solid (%):

Washed Oven Dry Wt. (g): 235.58

Washed Loss (g):

Specific Gravity :

Gravel	
Sand	92.0
Fines	8.0
Fineness Modulus	0.92



Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
24"	600.0						
18"	450.0						
12"	300.0						
8"	200.0						
6"	150.0						
5"	125.0						
4"	100.0						
3"	75.0						
2 1/2"	63.0						
2"	50.0						
1.5"	37.5						
1"	25.0						
3/4"	19.0						
1/2"	12.5						
3/8"	9.5						
1/4"	6.3						

Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
#4	4.75						
#8	2.36						
#10	2.00						
#16	1.18						
#20	0.85						
#30	0.60						
#40	0.425						
#50	0.30						
#60	0.25						
#100	0.15						
#200	0.075			235.58	235.58	92.0	8.0

Sample Identification		 FIRST QUANTUM MINERALS LTD. Cobre Panamá	
Informacion General (<i>Informacion General</i>)			
Sample number (<i>Numero de muestra</i>):		MPSA-RT-18027	
sampled date (<i>Fecha de muestreo</i>):		30-Sep-21	
Material Information (<i>Informacion del Material</i>)			
Source (<i>Fuente</i>)	Sand Cycloning Plant		
Work Area (<i>Area de Trabajo</i>)	TMF NSD Sec.4 Sand Cell Nº 28 (Capa 1).		
Borrow - Foundation - Excavation - Crusher - Fill - Site Investigation - Other: Plant <i>Prestamo - Fundacion - Excavacion - Crusher - Relleno - Investigacion de Sitio - Otro:</i>			
Fill Zone (specs 1824-363-CI-SPC-0003): <i>Zona de Material:</i>			
Material Type <i>Tipo de Material</i>		Cyclone Sand (Hydraulic)	% Fines
Remarks: <i>Comentarios:</i> Received: 10:25 hrs, Completed test: 13:40 hrs (30.09.2021)			
(Hydraulic placed and compacted)			
		Start sta.:	End Sta.:
Coordinates - GPS or Survey (<i>Coordenadas - GPS o Topografia</i>):		N: 982927	E: 535707
Depth used to estimate elevation: (<i>Profundidad a la que se tomo la muestra</i>):		1600mm	
Recorded Ground elevation: (<i>Elevacion del terreno</i>)		83.13 mm	
Technician:	Name: Francisco (ITP)	Signature:	
Lab Supervisor:	Name: CG	Signature:	

MINA COBRE PANAMA
Material Finer than 75mic. Sieve in Soil by Washing (ASTM D1140)



Sample Type: Cyclone Sand (Hydraulic) Technician: BG

Sample No: MPSA-RT-18027 Date Tested: 30-Sep-21

Source: Sand Cycloning Plant Date Sampled: 30-Sep-21

Location: TMF NSD Sec.4 Sand Cell N° 28 (Capa 1).

Other: % Fines

Wet Weight (g): 268.21

Moisture (%):

Orig. Dry Wt. (g): 229.92

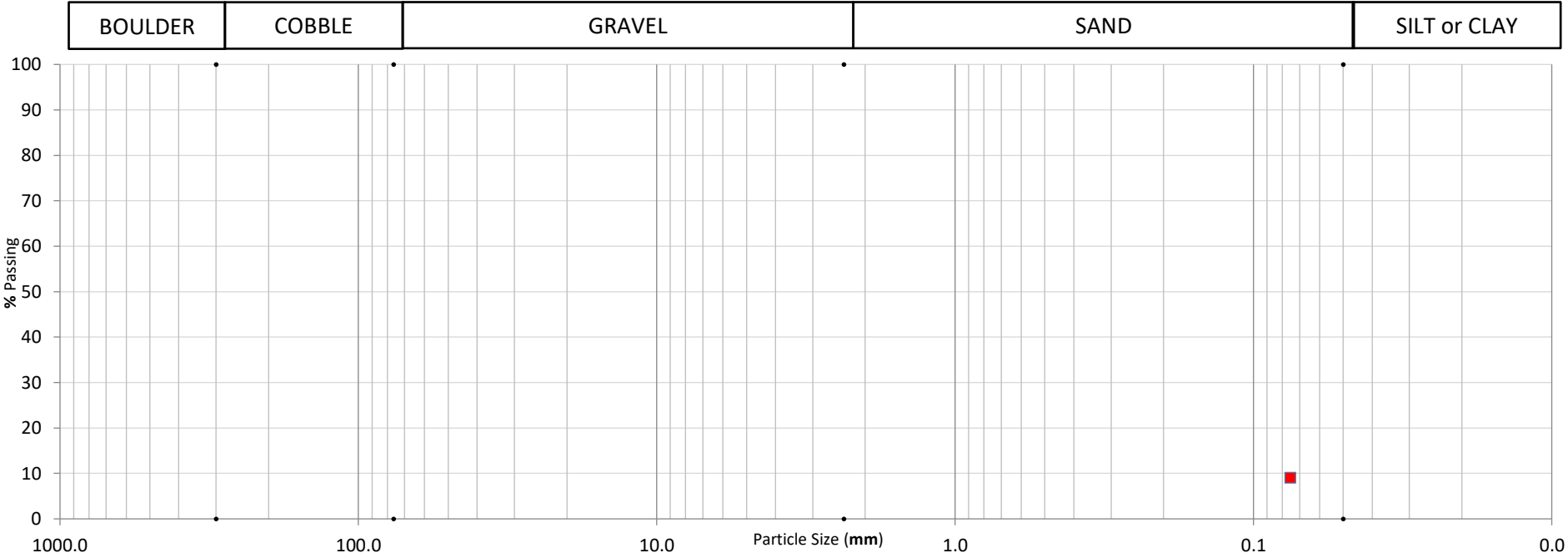
Total Solid (%):

Washed Oven Dry Wt. (g): 209.21

Washed Loss (g):

Specific Gravity :

Gravel	
Sand	91.0
Fines	9.0
Fineness Modulus	0.91



Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
24"	600.0						
18"	450.0						
12"	300.0						
8"	200.0						
6"	150.0						
5"	125.0						
4"	100.0						
3"	75.0						
2 1/2"	63.0						
2"	50.0						
1.5"	37.5						
1"	25.0						
3/4"	19.0						
1/2"	12.5						
3/8"	9.5						
1/4"	6.3						

Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
#4	4.75						
#8	2.36						
#10	2.00						
#16	1.18						
#20	0.85						
#30	0.60						
#40	0.425						
#50	0.30						
#60	0.25						
#100	0.15						
#200	0.075			209.21	209.21	91.0	9.0

Sample Identification		 FIRST QUANTUM MINERALS LTD. Cobre Panamá	
Informacion General (<i>Informacion General</i>)			
Sample number (<i>Numero de muestra</i>):		MPSA-RT-18028	
sampled date (<i>Fecha de muestreo</i>):		30-Sep-21	
Material Information (<i>Informacion del Material</i>)			
Source (<i>Fuente</i>)	Sand Cycloning Plant		
Work Area (<i>Area de Trabajo</i>)	TMF NSD Sec.4 Sand Cell Nº 28 (Capa 1).		
Borrow - Foundation - Excavation - Crusher - Fill - Site Investigation - Other: Plant <i>Prestamo - Fundacion - Excavacion - Crusher - Relleno - Investigacion de Sitio - Otro:</i>			
Fill Zone (specs 1824-363-CI-SPC-0003): <i>Zona de Material:</i>			
Material Type <i>Tipo de Material</i>		Cyclone Sand (Hydraulic)	% Fines
Remarks: <i>Comentarios:</i> Received: 10:25 hrs, Completed test: 13:40 hrs (30.09.2021)			
(Hydraulic placed and compacted)			
		Start sta.:	End Sta.:
Coordinates - GPS or Survey (<i>Coordenadas - GPS o Topografia</i>):		N: 982927	E: 535707
Depth used to estimate elevation: (<i>Profundidad a la que se tomo la muestra</i>):		1800mm	
Recorded Ground elevation: (<i>Elevacion del terreno</i>)		83.13 mm	
Technician:	Name: Francisco (ITP)	Signature:	
Lab Supervisor:	Name: CG	Signature:	

MINA COBRE PANAMA
Material Finer than 75mic. Sieve in Soil by Washing (ASTM D1140)



Sample Type: Cyclone Sand (Hydraulic) Technician: BG

Sample No: MPSA-RT-18028 Date Tested: 30-Sep-21

Source: Sand Cycloning Plant Date Sampled: 30-Sep-21

Location: TMF NSD Sec.4 Sand Cell N° 28 (Capa 1).

Other: % Fines

Wet Weight (g): 281.10

Moisture (%):

Orig. Dry Wt. (g): 246.26

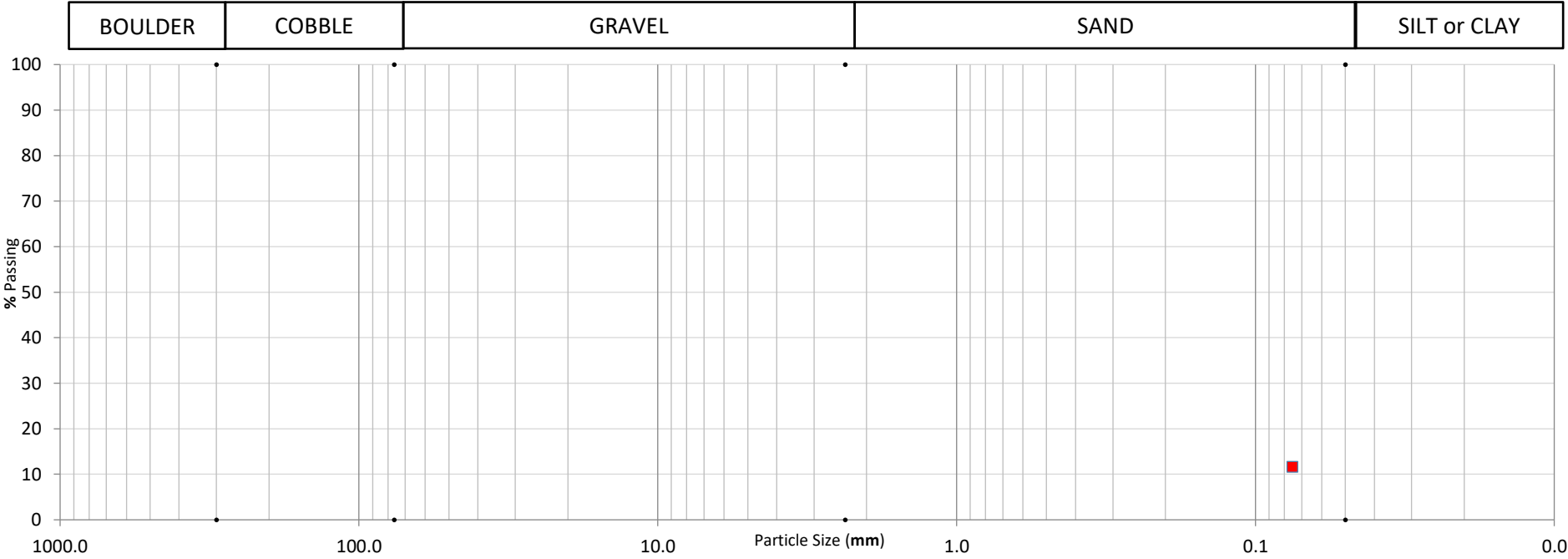
Total Solid (%):

Washed Oven Dry Wt. (g): 217.75

Washed Loss (g):

Specific Gravity :

Gravel	
Sand	88.4
Fines	11.6
Fineness Modulus	0.88



Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
24"	600.0						
18"	450.0						
12"	300.0						
8"	200.0						
6"	150.0						
5"	125.0						
4"	100.0						
3"	75.0						
2 1/2"	63.0						
2"	50.0						
1.5"	37.5						
1"	25.0						
3/4"	19.0						
1/2"	12.5						
3/8"	9.5						
1/4"	6.3						

Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
#4	4.75						
#8	2.36						
#10	2.00						
#16	1.18						
#20	0.85						
#30	0.60						
#40	0.425						
#50	0.30						
#60	0.25						
#100	0.15						
#200	0.075			217.75	217.75	88.4	11.6

Sample Identification		 FIRST QUANTUM MINERALS LTD. Cobre Panamá	
Informacion General (<i>Informacion General</i>)			
Sample number (<i>Numero de muestra</i>):		MPSA-RT-18029	
sampled date (<i>Fecha de muestreo</i>):		30-Sep-21	
Material Information (<i>Informacion del Material</i>)			
Source (<i>Fuente</i>)	Sand Cycloning Plant		
Work Area (<i>Area de Trabajo</i>)	TMF NSD Sec.4 Sand Cell Nº 28 (Capa 1).		
Borrow - Foundation - Excavation - Crusher - Fill - Site Investigation - Other: Plant <i>Prestamo - Fundacion - Excavacion - Crusher - Relleno - Investigacion de Sitio - Otro:</i>			
Fill Zone (specs 1824-363-CI-SPC-0003): <i>Zona de Material:</i>			
Material Type <i>Tipo de Material</i>		Cyclone Sand (Hydraulic)	% Fines
Remarks: <i>Comentarios:</i> Received: 10:25 hrs, Completed test: 13:40 hrs (30.09.2021)			
PT.2 (Hydraulic placed and compacted)			
		Start sta.:	End Sta.:
Coordinates - GPS or Survey (<i>Coordenadas - GPS o Topografia</i>):		N: 982870	E: 535689
Depth used to estimate elevation: (<i>Profundidad a la que se tomo la muestra</i>):		1000mm	
Recorded Ground elevation: (<i>Elevacion del terreno</i>)		84.09 mm	
Technician:	Name: Francisco (ITP)	Signature:	
Lab Supervisor:	Name: CG	Signature:	

MINA COBRE PANAMA
Material Finer than 75mic. Sieve in Soil by Washing (ASTM D1140)



Sample Type: Cyclone Sand (Hydraulic) Technician: BG

Sample No: MPSA-RT-18029 Date Tested: 30-Sep-21

Source: Sand Cycloning Plant Date Sampled: 30-Sep-21

Location: TMF NSD Sec.4 Sand Cell N° 28 (Capa 1).

Other: % Fines

Wet Weight (g): 261.43

Moisture (%):

Orig. Dry Wt. (g): 240.47

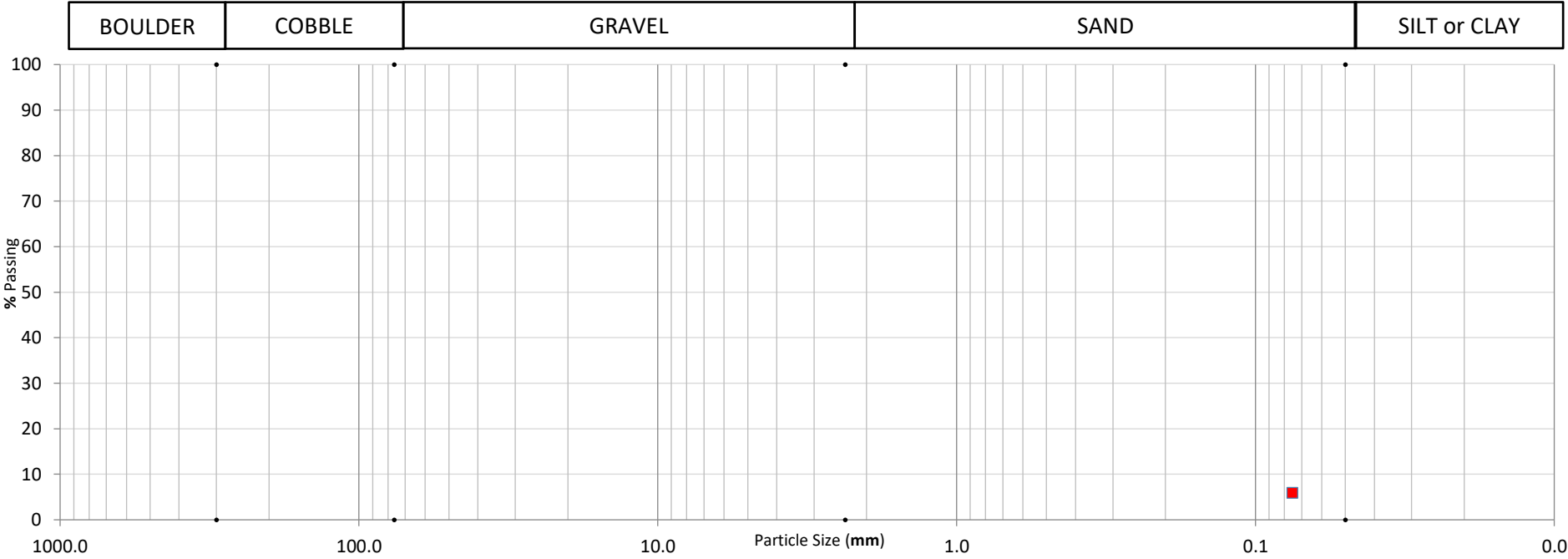
Total Solid (%):

Washed Oven Dry Wt. (g): 226.37

Washed Loss (g):

Specific Gravity :

Gravel	
Sand	94.1
Fines	5.9
Fineness Modulus	0.94



Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
24"	600.0						
18"	450.0						
12"	300.0						
8"	200.0						
6"	150.0						
5"	125.0						
4"	100.0						
3"	75.0						
2 1/2"	63.0						
2"	50.0						
1.5"	37.5						
1"	25.0						
3/4"	19.0						
1/2"	12.5						
3/8"	9.5						
1/4"	6.3						

Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
#4	4.75						
#8	2.36						
#10	2.00						
#16	1.18						
#20	0.85						
#30	0.60						
#40	0.425						
#50	0.30						
#60	0.25						
#100	0.15						
#200	0.075			226.37	226.37	94.1	5.9

Sample Identification		 FIRST QUANTUM MINERALS LTD. Cobre Panamá	
	Informacion General (Informacion General)		
	Sample number (Numero de muestra):	MPSA-RT-18114	
	sampled date (Fecha de muestreo):	2-Oct-21	
	Material Information (Informacion del Material)		
	Source (Fuente)	Sand Cycloning Plant / CSF #6	
	Work Area (Area de Trabajo)	TMF ESD WRP-3 Sand Cell N° 29/30 Plataforma (capa-1)	
	Borrow - Foundation - Excavation - Crusher - Fill - Site Investigation - Other: Plant Prestamo - Fundacion - Excavacion - Crusher - Relleno - Investigacion de Sitio - Otro:		
	Fill Zone (specs 1824-363-CI-SPC-0003): Zona de Material:		
	Material Type Tipo de Material	Cyclone Sand (Mechanical)	% Fines
	Remarks: Comentarios: Received: 14:25 hrs, Completed test: 16:20 hrs (02-10-21)		
	Punto #1 (mechanically placed and compacted)		
		Start sta.:	End Sta.:
	Coordinates - GPS or Survey (Coordenadas - GPS o Topografia):	N: 981295	E: 538768
	Depth used to estimate elevation: (Profundidad a la que se tomo la muestra):	300 mm	
	Recorded Ground elevation: (Elevacion del terreno)	79.36 m	
Technician:	Name: (ITP)	Signature:	
Lab Supervisor:	Name: CG	Signature:	

Form No. 1824-QC-LST-057 Rv02 Dual language

MINA COBRE PANAMA
Material Finer than 75mic. Sieve in Soil by Washing (ASTM D1140)



Sample Type: Cyclone Sand (Mechanical) Technician: AP/BG

Sample No: MPSA-RT-18114 Date Tested: 2-Oct-21

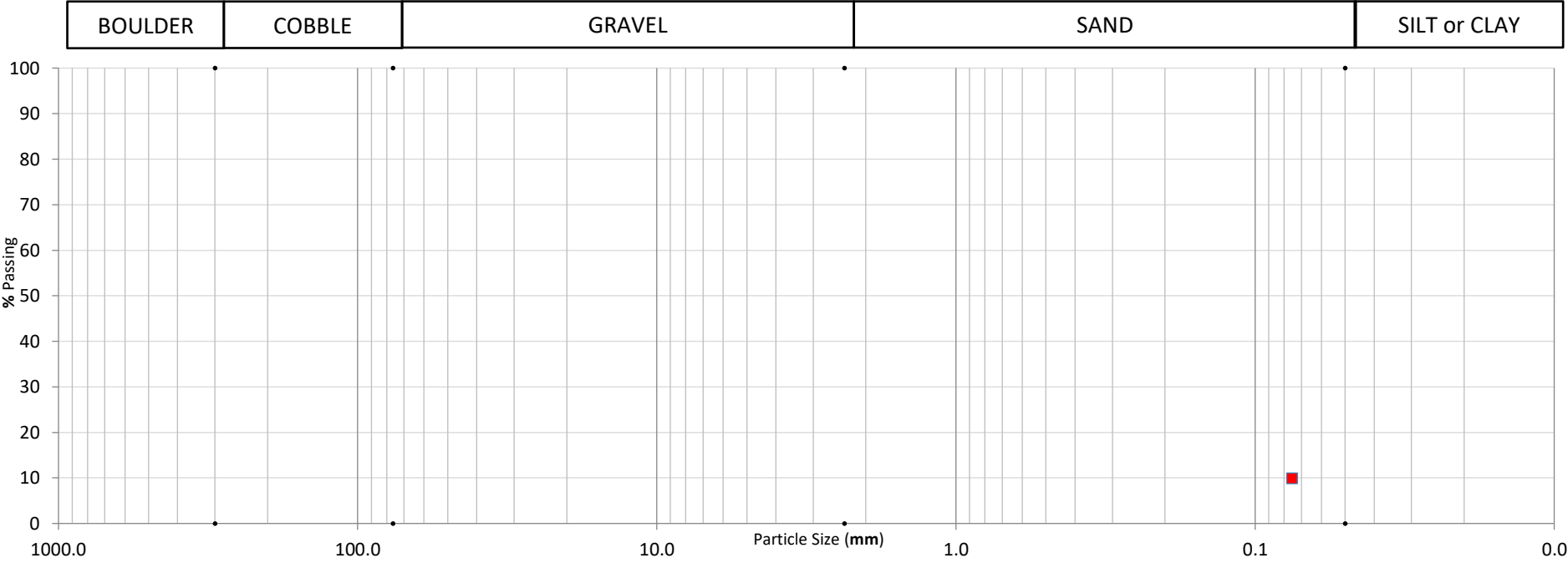
Source: Sand Cycloning Plant / CSF #6 Date Sampled: 2-Oct-21

Location: TMF ESD WRP-3 Sand Cell N° 29/30
Plataforma (capa-1)

Other: % Fines

Wet Weight (g):	281.18
Moisture (%):	7.6
Orig. Dry Wt. (g):	261.29
Total Solid (%):	
Washed Oven Dry Wt. (g):	235.62
Washed Loss (g):	
Specific Gravity :	

Gravel	
Sand	90.2
Fines	9.8
Fineness Modulus	0.90



Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
24"	600.0						
18"	450.0						
12"	300.0						
8"	200.0						
6"	150.0						
5"	125.0						
4"	100.0						
3"	75.0						
2 1/2"	63.0						
2"	50.0						
1.5"	37.5						
1"	25.0						
3/4"	19.0						
1/2"	12.5						
3/8"	9.5						
1/4"	6.3						

Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
#4	4.75						
#8	2.36						
#10	2.00						
#16	1.18						
#20	0.85						
#30	0.60						
#40	0.425						
#50	0.30						
#60	0.25						
#100	0.15						
#200	0.075			235.62	235.62	90.2	9.8

Sample Identification		 FIRST QUANTUM MINERALS LTD. Cobre Panamá	
1	Informacion General (Informacion General)		
	Sample number (Numero de muestra):	MPSA-19389	
	sampled date (Fecha de muestreo):	6-Nov-21	
2	Material Information (Informacion del Material)		
	Source (Fuente)	Sand Cycloning Plant / Sand Cell N°41	
	Work Area (Area de Trabajo)	TMF ESD WRP 5 Sand Cell N°12 Platform, North Side, High Part, 1st Layer (inplace)	
	Borrow - Foundation - Excavation - Crusher - Fill - Site Investigation - Other: Plant <i>Prestamo - Fundacion - Excavacion - Crusher - Relleno - Investigacion de Sitio - Otro:</i>		
	Fill Zone (specs 1824-363-CI-SPC-0003): <i>Zona de Material:</i>		
	Material Type <i>Tipo de Material</i>	Cyclone Sand (Mecanical)	% Fines
	Remarks: <i>Comentarios:</i> received: 10:12hrs, Complete test: 13:21hrs (06.11.2021)		
	Pt.1 (Mechanically placed and compacted)		
		Start sta.:	End Sta.:
	Coordinates - GPS or Survey <i>(Coordenadas - GPS o Topografia):</i>	N: 979613	E: 539072
	Depth used to estimate elevation: <i>(Profundidad a la que se tomo la muestra):</i>	300mm	
	Recorded Ground elevation: <i>(Elevacion del terreno)</i>	88.17m	
Technician:	Name: Francisco (ITP)	Signature:	
Lab Supervisor:	Name: CG	Signature:	

MINA COBRE PANAMA
Material Finer than 75mic. Sieve in Soil by Washing (ASTM D1140)



Sample Type: Cyclone Sand (Hydraulic) Technician: FM/BG

Sample No: MPSA-19389 Date Tested: 6-Nov-21

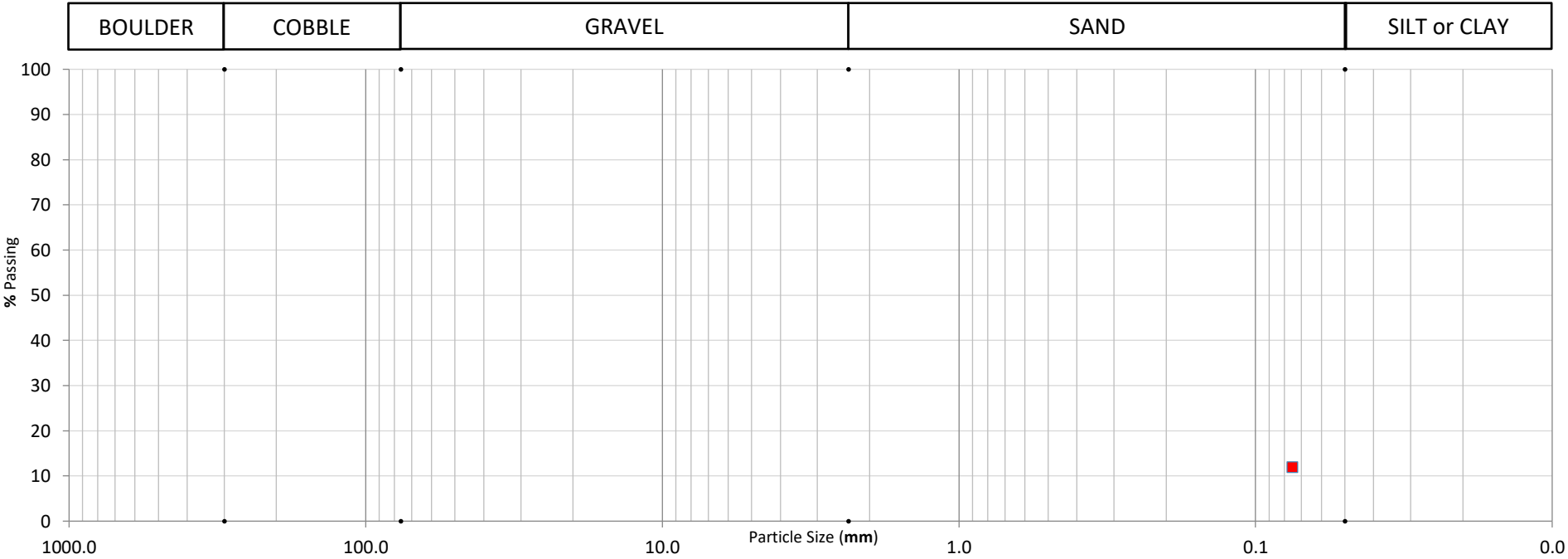
Source: Sand Cycloning Plant Date Sampled: 6-Nov-21

Location: TMF ESD WRP 5 Sand Cell N°12 Platform, North Side, High Part, 1st Layer (inplace)

Other: % Fines

Wet Weight (g):	298.12
Moisture (%):	10.3
Orig. Dry Wt. (g):	270.22
Total Solid (%):	
Washed Oven Dry Wt. (g):	238.18
Washed Loss (g):	
Specific Gravity :	

Gravel	
Sand	88.1
Fines	11.9
Fineness Modulus	0.88



Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
24"	600.0						
18"	450.0						
12"	300.0						
8"	200.0						
6"	150.0						
5"	125.0						
4"	100.0						
3"	75.0						
2 1/2"	63.0						
2"	50.0						
1.5"	37.5						
1"	25.0						
3/4"	19.0						
1/2"	12.5						
3/8"	9.5						
1/4"	6.3						

Sieve No	Sieve Size (mm)	Coarser Limit	Finer Limit	Ind. Ret. Wt. (g)	Cum. Ret. Wt. (g)	% Retained	% Passing
#4	4.75						
#8	2.36						
#10	2.00						
#16	1.18						
#20	0.85						
#30	0.60						
#40	0.425						
#50	0.30						
#60	0.25						
#100	0.15						
#200	0.075			238.18	238.18	88.1	11.9